

PGDM-IBM, 2016-18
Adv. Actuarial Science
INS-404-C

Trimester – IV, End-Term Examination: September 2017

Time allowed: 2 Hrs 30 Min
Max Marks: 50

Roll No: _____

Instruction: Students are required to write Roll No on every page of the question paper, writing anything except the Roll No will be treated as **Unfair Means**. All other instructions on the reverse of Admit Card should be followed meticulously.

Sections	No. of Questions to attempt	Marks	Marks
A	3 out of 5 (Short Questions)	5 Marks each	$3 \times 5 = 15$
B	2 out of 3 (Long Questions)	10 Marks each	$2 \times 10 = 20$
C	Compulsory Case Study	15 Marks	15
		Total Marks	50

Section-A

A1. A bank lends a company Rs 25,000 at a fixed rate of interest of 10% *pa*. The loan is to be repaid by five level annual payments. Calculate the interest and capital payments at each repayment date.

A2. If the annual risk premium is Rs 12,000 then find the annual gross premium using the rates given below on gross basis

- Risk Margin is 1%
- Management Expense is 5%
- Operating Expense is 5%
- Commission is 5%
- Profit Margin is 10%

A3. A healthy life, 30 years old, purchases a Whole life plan with a Sum Assured of Rs 20,00,000. The annual premium is to be paid in advance for 20 years. Calculate the risk premium

[Use AM 92 ultimate mortality table @6%]

A4. Calculate the E.P.V of the benefits to be paid to customer for taking a Term Insurance plan. Details are given below :

- A healthy life aged 20 years takes the Term Insurance policy for 30 years
- Sum Assured is Rs 40,00,000 to be paid immediately at the time of death
- Use AM 92 ultimate mortality table @4%

A5. Calculate the present value as at 1 March 2005 of a series of payments of £1,000 payable on the first day of each month from April 2005 to December 2005 inclusive, assuming a rate of interest of 6% *pa* convertible monthly.

Section-B

B1. Using the information given below, Find the annual risk premium of the policy :

- A healthy life aged 25 purchases a 30 year Term Insurance plan
- Sum assured is Rs 10,00,000
- Benefit is to be paid at the end of the year of death
- Premium is being paid annually in advance for 10 years
- Use AM 92 Ultimate mortality @4%

B2. A healthy life, 50 years old, purchases a Whole life plan with a Sum Assured of Rs. 30,00,000 in which benefit is to be paid immediately at the time of death. Premium is paid annually in advance for 10 years. Calculate the annual risk premium [AM 92 Ultimate mortality @6%]

Then find the prospective and retrospective reserves at the end of 5th term of the policy period [AM 92 Ultimate mortality @6%]

B3. A loan of Rs 50,000 is repayable by equal annual payments at the end of each of the next 5 years. Interest is 8% pa for the first three years and 12% pa thereafter. Calculate the loan outstanding immediately after the second repayment.

Section-C

Case Study Compulsory:-

This case study is divided into 3 parts :

Calculation of Risk Premium

Calculation of Annual Gross Premium

Calculation of Prospective and Retrospective Reserves

Using the information given below, find the annual risk/net premium of the policy :

- A healthy life, 30 years old, purchases a 40 year double endowment policy
- Sum Assured is Rs 30,00,000
- Premium is being paid annually in advance throughout the policy term
- Benefit is to be paid at the end of the year of death
- Use AM 92 Ultimate mortality @4%

Then calculate the annual gross premium if following rates are based on Gross basis

- Risk Margin is 1%
- Management Expense is 5%
- Operating Expense is 5%
- Commission is 10%
- Profit Margin is 9%

Using all the above information and taking the Gross premium, calculate the Prospective and Retrospective reserves after the end of 25th year of policy term

ASSURED LIVES MORTALITY TABLE

AM92

This table is based on the mortality of assured male lives in the UK during the years 1991, 1992, 1993, and 1994. Full details are given in *C.M.I.R.* 17.

Due to potential rounding errors at high ages, the commutation functions (D_x , N_x , S_x , C_x , M_x and R_x) are tabulated here to age 110 only.

AM92

x	l_x	$l_{x-1}+1$	l_x	x
17	9 997.809 1		10 000.000 0	17
18	9 991.890 4	9 993.540 0	9 994.000 0	18
19	9 986.035 1	9 987.633 8	9 988.063 6	19
20	9 980.243 2	9 981.791 1	9 982.200 6	20
21	9 974.504 6	9 976.001 6	9 976.390 9	21
22	9 968.839 1	9 970.265 4	9 970.634 6	22
23	9 963.196 7	9 964.582 4	9 964.931 3	23
24	9 957.577 5	9 958.922 5	9 959.261 3	24
25	9 951.991 3	9 953.285 8	9 953.614 4	25
26	9 946.398 2	9 947.662 2	9 947.980 7	26
27	9 940.798 4	9 942.021 8	9 942.340 2	27
28	9 935.181 8	9 936.354 9	9 936.673 0	28
29	9 929.508 8	9 930.661 3	9 930.969 4	29
30	9 923.749 7	9 924.891 6	9 925.209 4	30
31	9 917.914 5	9 919.026 0	9 919.353 5	31
32	9 911.953 8	9 913.054 7	9 913.382 1	32
33	9 905.828 2	9 906.928 5	9 907.265 5	33
34	9 899.498 4	9 900.607 8	9 900.964 5	34
35	9 892.915 1	9 894.053 6	9 894.429 9	35
36	9 886.039 5	9 887.206 9	9 887.612 6	36
37	9 878.812 8	9 880.028 8	9 880.454 0	37
38	9 871.166 5	9 872.450 8	9 872.895 4	38
39	9 863.022 7	9 864.404 7	9 864.868 8	39
40	9 854.303 6	9 855.793 1	9 856.286 3	40
41	9 844.902 5	9 846.538 4	9 847.051 0	41
42	9 834.703 0	9 836.524 5	9 837.066 1	42
43	9 823.599 4	9 825.635 4	9 826.206 0	43
44	9 811.447 3	9 813.746 3	9 814.335 9	44
45	9 798.083 7	9 800.693 9	9 801.312 3	45
46	9 783.337 1	9 786.316 2	9 786.953 4	46
47	9 766.998 3	9 770.423 1	9 771.078 9	47
48	9 748.860 3	9 752.787 4	9 753.471 4	48
49	9 728.649 9	9 733.193 8	9 733.886 5	49
50	9 706.097 7	9 711.352 4	9 712.072 8	50
51	9 680.899 0	9 686.966 9	9 687.714 9	51
52	9 652.696 5	9 659.707 5	9 660.502 1	52
53	9 621.100 6	9 629.211 5	9 630.052 2	53
54	9 585.691 6	9 595.056 3	9 595.971 5	54
55	9 545.992 9	9 556.800 3	9 557.817 9	55
56	9 501.483 9	9 513.937 5	9 515.104 0	56
57	9 451.593 8	9 465.929 3	9 467.290 6	57
58	9 395.697 1	9 412.171 2	9 413.800 4	58
59	9 333.128 4	9 352.016 5	9 354.004 0	59
60	9 263.142 2	9 284.764 1	9 287.216 4	60
61	9 184.968 7	9 209.656 8	9 212.714 3	61
62	9 097.740 5	9 125.881 8	9 129.717 0	62
63	9 000.588 4	9 032.564 2	9 037.397 3	63
64	8 892.574 1	8 928.817 7	8 934.877 1	64

AM92

x	l_x	$l_{x-1}+1$	l_x	x
65	8 772.735 9	8 813.688 1	8 821.261 2	65
66	8 640.048 1	8 686.201 6	8 695.619 9	66
67	8 493.518 7	8 545.353 2	8 557.011 8	67
68	8 332.139 6	8 390.161 1	8 404.491 6	68
69	8 154.931 8	8 219.639 0	8 237.132 9	69
70	7 960.977 6	8 032.860 6	8 054.054 4	70
71	7 749.465 9	7 828.968 6	7 854.450 8	71
72	7 519.702 7	7 607.240 0	7 637.620 8	72
73	7 271.146 1	7 367.082 8	7 403.008 4	73
74	7 003.521 6	7 108.105 2	7 150.240 1	74
75	6 716.823 1	6 830.184 4	6 879.167 3	75
76	6 411.345 9	6 533.500 8	6 589.925 8	76
77	6 087.808 4	6 218.575 9	6 282.980 3	77
78	5 747.362 4	5 886.362 8	5 959.168 0	78
79	5 391.640 0	5 538.279 1	5 619.757 7	79
80	5 022.793 1	5 176.222 4	5 266.460 4	80
81	4 643.512 9	4 802.629 0	4 901.478 9	81
82	4 257.005 6	4 420.452 5	4 527.496 0	82
83	3 866.988 4	4 033.146 7	4 147.670 8	83
84	3 477.592 9	3 644.632 7	3 765.599 8	84
85	3 093.286 3	3 259.186 2	3 385.247 9	85
86	2 718.712 8	2 881.346 7	3 010.839 5	86
87	2 358.529 9	2 515.731 0	2 646.741 6	87
88	2 017.229 8	2 166.880 5	2 297.297 6	88
89	1 698.908 9	1 839.043 8	1 966.649 9	89
90	1 407.055 0	1 535.980 1	1 658.554 5	90
91		1 260.735 4	1 376.190 6	91
92			1 121.988 9	92
93			897.502 5	93
94			703.324 2	94
95			539.064 3	95
96			403.402 3	96
97			294.206 1	97
98			208.706 0	98
99			143.712 0	99
100			95.847 6	100
101			61.773 3	101
102			38.379 6	102
103			22.928 4	103
104			13.135 9	104
105			7.196 8	105
106			3.759 6	106
107			1.866 9	107
108			0.878 4	108
109			0.390 3	109
110			0.163 2	110
111			0.064 0	111
112			0.023 4	112
113			0.008 0	113
114			0.002 5	114
115			0.000 7	115
116			0.000 2	116
117			0.000 0	117
118			0.000 0	118
119			0.000 0	119
120			0.000 0	120

AM92

x	d _[x]	d _{[x-1]+1}	d _x	x
17	4.269 1		6.000 0	17
18	4.256 5	5.476 5	5.936 4	18
19	4.244 1	5.433 3	5.863 0	19
20	4.241 6	5.400 1	5.809 6	20
21	4.239 2	5.367 1	5.756 4	21
22	4.256 7	5.334 1	5.703 2	22
23	4.274 2	5.321 1	5.670 0	23
24	4.291 7	5.308 1	5.646 9	24
25	4.329 1	5.305 1	5.633 7	25
26	4.376 4	5.322 0	5.640 5	26
27	4.443 5	5.348 8	5.667 1	27
28	4.520 5	5.385 5	5.703 7	28
29	4.617 2	5.451 9	5.760 0	29
30	4.723 7	5.538 1	5.855 9	30
31	4.859 8	5.643 9	5.971 5	31
32	5.025 4	5.789 2	6.116 6	32
33	5.220 4	5.964 0	6.301 0	33
34	5.444 7	6.178 0	6.534 6	34
35	5.708 2	6.441 0	6.817 3	35
36	6.010 7	6.753 0	7.158 6	36
37	6.362 0	7.133 4	7.558 5	37
38	6.761 7	7.582 0	8.026 7	38
39	7.229 6	8.118 4	8.582 4	39
40	7.765 2	8.742 1	9.235 3	40
41	8.378 0	9.472 4	9.984 9	41
42	9.067 6	10.318 5	10.860 1	42
43	9.853 1	11.299 5	11.870 1	43
44	10.753 3	12.434 0	13.023 6	44
45	11.767 5	13.740 6	14.358 9	45
46	12.914 0	15.237 3	15.874 4	46
47	14.211 0	16.951 7	17.607 5	47
48	15.666 4	18.900 9	19.585 0	48
49	17.297 5	21.121 0	21.813 6	49
50	19.130 7	23.637 4	24.357 9	50
51	21.191 5	26.464 8	27.212 8	51
52	23.485 0	29.655 3	30.449 9	52
53	26.044 3	33.240 0	34.080 8	53
54	28.891 3	37.238 4	38.153 6	54
55	32.055 4	41.696 3	42.713 9	55
56	35.554 6	46.646 8	47.813 4	56
57	39.422 6	52.128 9	53.490 2	57
58	43.680 6	58.167 2	59.796 5	58
59	48.364 3	64.800 1	66.787 6	59
60	53.485 4	72.049 8	74.502 0	60
61	59.086 9	79.939 8	82.997 3	61
62	65.176 2	88.484 6	92.319 7	62
63	71.770 7	97.687 2	102.520 2	63
64	78.886 0	107.556 5	113.615 9	64

AM92

x	d _[x]	d _{[x-1]+1}	d _x	x
65	86.534 3	118.068 2	125.641 2	65
66	94.694 9	129.189 9	138.608 2	66
67	103.357 6	140.861 6	152.520 2	67
68	112.500 5	153.028 1	167.358 6	68
69	122.071 2	165.584 6	183.078 5	69
70	132.008 9	178.409 8	199.603 6	70
71	142.225 9	191.347 8	216.830 0	71
72	152.619 9	204.231 6	234.612 4	72
73	163.040 9	216.842 7	252.768 3	73
74	173.337 2	228.937 9	271.072 8	74
75	183.322 3	240.258 6	289.241 5	75
76	192.769 9	250.520 6	306.945 6	76
77	201.445 6	259.407 9	323.812 2	77
78	209.083 3	266.605 1	339.410 4	78
79	215.417 6	271.818 7	353.297 3	79
80	220.164 1	274.743 5	364.981 5	80
81	223.060 4	275.133 0	373.982 8	81
82	223.858 9	272.781 7	379.825 2	82
83	222.355 7	267.546 8	382.071 0	83
84	218.406 7	259.384 9	380.351 9	84
85	211.939 6	248.346 7	374.408 4	85
86	202.981 8	234.605 0	364.097 8	86
87	191.649 4	218.433 4	349.444 0	87
88	178.183 9	200.230 6	330.647 8	88
89	162.928 8	180.491 3	308.095 4	89
90	146.319 7	159.789 5	282.363 9	90
91		138.746 4	254.201 7	91
92			224.486 4	92
93			194.178 3	93
94			164.260 0	94
95			135.662 0	95
96			109.196 2	96
97			85.500 1	97
98			64.994 0	98
99			47.864 4	99
100			34.074 3	100
101			23.393 7	101
102			15.451 2	102
103			9.792 5	103
104			5.939 1	104
105			3.437 3	105
106			1.892 7	106
107			.988 5	107
108			.488 1	108
109			.227 1	109
110			.099 2	110
111			.040 5	111
112			.015 4	112
113			.005 5	113
114			.001 8	114
115			.000 5	115
116			.000 1	116
117			.000 0	117
118			.000 0	118
119			.000 0	119
120			.000 0	120

AM92

x	q _[x]	q _{[x-1]+1}	q _x	x
17	.000 427		.000 600	17
18	.000 426	.000 548	.000 594	18
19	.000 425	.000 544	.000 587	19
20	.000 425	.000 541	.000 582	20
21	.000 425	.000 538	.000 577	21
22	.000 427	.000 535	.000 572	22
23	.000 429	.000 534	.000 569	23
24	.000 431	.000 533	.000 567	24
25	.000 435	.000 533	.000 566	25
26	.000 440	.000 535	.000 567	26
27	.000 447	.000 538	.000 570	27
28	.000 455	.000 542	.000 574	28
29	.000 465	.000 549	.000 580	29
30	.000 476	.000 558	.000 590	30
31	.000 490	.000 569	.000 602	31
32	.000 507	.000 584	.000 617	32
33	.000 527	.000 602	.000 636	33
34	.000 550	.000 624	.000 660	34
35	.000 577	.000 651	.000 689	35
36	.000 608	.000 683	.000 724	36
37	.000 644	.000 722	.000 765	37
38	.000 685	.000 768	.000 813	38
39	.000 733	.000 823	.000 870	39
40	.000 788	.000 887	.000 937	40
41	.000 851	.000 962	.001 014	41
42	.000 922	.001 049	.001 104	42
43	.001 003	.001 150	.001 208	43
44	.001 096	.001 267	.001 327	44
45	.001 201	.001 402	.001 465	45
46	.001 320	.001 557	.001 622	46
47	.001 455	.001 735	.001 802	47
48	.001 607	.001 938	.002 008	48
49	.001 778	.002 170	.002 241	49
50	.001 971	.002 434	.002 508	50
51	.002 189	.002 732	.002 809	51
52	.002 433	.003 070	.003 152	52
53	.002 707	.003 452	.003 539	53
54	.003 014	.003 881	.003 976	54
55	.003 358	.004 363	.004 469	55
56	.003 742	.004 903	.005 025	56
57	.004 171	.005 507	.005 650	57
58	.004 649	.006 180	.006 352	58
59	.005 182	.006 929	.007 140	59
60	.005 774	.007 760	.008 022	60
61	.006 433	.008 680	.009 009	61
62	.007 164	.009 696	.010 112	62
63	.007 974	.010 815	.011 344	63
64	.008 871	.012 046	.012 716	64

AM92

x	q _[x]	q _{[x-1]+1}	q _x	x
65	.009 864	.013 396	.014 243	65
66	.010 960	.014 873	.015 940	66
67	.012 169	.016 484	.017 824	67
68	.013 502	.018 239	.019 913	68
69	.014 969	.020 145	.022 226	69
70	.016 582	.022 210	.024 783	70
71	.018 353	.024 441	.027 606	71
72	.020 296	.026 847	.030 718	72
73	.022 423	.029 434	.034 144	73
74	.024 750	.032 208	.037 911	74
75	.027 293	.035 176	.042 046	75
76	.030 067	.038 344	.046 578	76
77	.033 090	.041 715	.051 538	77
78	.036 379	.045 292	.056 956	78
79	.039 954	.049 080	.062 867	79
80	.043 833	.053 078	.069 303	80
81	.048 037	.057 288	.076 300	81
82	.052 586	.061 709	.083 893	82
83	.057 501	.066 337	.092 117	83
84	.062 804	.071 169	.101 007	84
85	.068 516	.076 199	.110 600	85
86	.074 661	.081 422	.120 929	86
87	.081 258	.086 827	.132 038	87
88	.088 331	.092 405	.143 929	88
89	.095 902	.098 144	.156 660	89
90	.103 990	.104 031	.170 247	90
91		.110 052	.184 714	91
92			.200 079	92
93			.216 354	93
94			.233 548	94
95			.251 662	95
96			.270 688	96
97			.290 613	97
98			.311 414	98
99			.333 058	99
100			.355 505	100
101			.378 702	101
102			.402 588	102
103			.427 090	103
104			.452 127	104
105			.477 608	105
106			.503 432	106
107			.529 493	107
108			.555 674	108
109			.581 857	109
110			.607 918	110
111			.633 731	111
112			.659 171	112
113			.684 114	113
114			.708 442	114
115			.732 042	115
116			.754 809	116
117			.776 648	117
118			.797 477	118
119			.817 225	119
120			1.000 000	120

AM92

x	$\mu_{[x]}$	$\mu_{[x-1]+1}$	μ_x	x
17	0.000 367		0.000 603	17
18	0.000 367	0.000 488	0.000 597	18
19	0.000 367	0.000 485	0.000 591	19
20	0.000 369	0.000 483	0.000 585	20
21	0.000 370	0.000 482	0.000 580	21
22	0.000 374	0.000 480	0.000 574	22
23	0.000 377	0.000 481	0.000 570	23
24	0.000 380	0.000 481	0.000 568	24
25	0.000 385	0.000 482	0.000 566	25
26	0.000 391	0.000 485	0.000 566	26
27	0.000 400	0.000 489	0.000 568	27
28	0.000 408	0.000 495	0.000 572	28
29	0.000 419	0.000 502	0.000 577	29
30	0.000 430	0.000 512	0.000 585	30
31	0.000 443	0.000 523	0.000 596	31
32	0.000 460	0.000 537	0.000 609	32
33	0.000 479	0.000 555	0.000 626	33
34	0.000 500	0.000 576	0.000 647	34
35	0.000 524	0.000 601	0.000 674	35
36	0.000 551	0.000 630	0.000 706	36
37	0.000 582	0.000 665	0.000 744	37
38	0.000 616	0.000 706	0.000 788	38
39	0.000 656	0.000 754	0.000 840	39
40	0.000 701	0.000 810	0.000 902	40
41	0.000 752	0.000 875	0.000 974	41
42	0.000 808	0.000 950	0.001 057	42
43	0.000 871	0.001 037	0.001 154	43
44	0.000 943	0.001 136	0.001 265	44
45	0.001 023	0.001 250	0.001 394	45
46	0.001 113	0.001 380	0.001 541	46
47	0.001 214	0.001 529	0.001 709	47
48	0.001 326	0.001 698	0.001 902	48
49	0.001 451	0.001 890	0.002 122	49
50	0.001 592	0.002 108	0.002 372	50
51	0.001 750	0.002 354	0.002 656	51
52	0.001 925	0.002 633	0.002 978	52
53	0.002 122	0.002 947	0.003 343	53
54	0.002 342	0.003 300	0.003 756	54
55	0.002 588	0.003 696	0.004 221	55
56	0.002 862	0.004 139	0.004 747	56
57	0.003 170	0.004 636	0.005 340	57
58	0.003 513	0.005 189	0.006 005	58
59	0.003 898	0.005 806	0.006 754	59
60	0.004 327	0.006 493	0.007 593	60
61	0.004 809	0.007 254	0.008 533	61
62	0.005 348	0.008 099	0.009 586	62
63	0.005 949	0.009 032	0.010 763	63
64	0.006 623	0.010 063	0.012 078	64

AM92

x	$\mu_{[x]}$	$\mu_{[x-1]+1}$	μ_x	x
65	0.007 377	0.011 199	0.013 544	65
66	0.008 220	0.012 449	0.015 176	66
67	0.009 162	0.013 821	0.016 993	67
68	0.010 216	0.015 326	0.019 012	68
69	0.011 393	0.016 972	0.021 255	69
70	0.012 709	0.018 771	0.023 741	70
71	0.014 178	0.020 733	0.026 496	71
72	0.015 819	0.022 869	0.029 543	72
73	0.017 648	0.025 190	0.032 912	73
74	0.019 687	0.027 708	0.036 631	74
75	0.021 959	0.030 436	0.040 732	75
76	0.024 487	0.033 385	0.045 251	76
77	0.027 300	0.036 569	0.050 223	77
78	0.030 423	0.040 000	0.055 689	78
79	0.033 892	0.043 691	0.061 689	79
80	0.037 737	0.047 656	0.068 271	80
81	0.041 996	0.051 909	0.075 481	81
82	0.046 709	0.056 462	0.083 372	82
83	0.051 916	0.061 329	0.091 999	83
84	0.057 665	0.066 524	0.101 417	84
85	0.064 000	0.072 061	0.111 691	85
86	0.070 978	0.077 952	0.122 884	86
87	0.078 646	0.084 213	0.135 066	87
88	0.087 067	0.090 853	0.148 309	88
89	0.096 302	0.097 889	0.162 691	89
90	0.106 409	0.105 333	0.178 289	90
91		0.113 198	0.195 190	91
92			0.213 482	92
93			0.233 257	93
94			0.254 610	94
95			0.277 645	95
96			0.302 462	96
97			0.329 170	97
98			0.357 882	98
99			0.388 711	99
100			0.421 777	100
101			0.457 202	101
102			0.495 111	102
103			0.535 631	103
104			0.578 890	104
105			0.625 023	105
106			0.674 162	106
107			0.726 443	107
108			0.782 002	108
109			0.840 973	109
110			0.903 494	110
111			0.969 700	111
112			1.039 723	112
113			1.113 695	113
114			1.191 744	114
115			1.274 000	115
116			1.360 581	116
117			1.451 603	117
118			1.547 178	118
119			1.647 417	119

AM92

x	q_x	$q_{x-1}+1$	e_x	x
17	61.353		61.339	17
18	60.389	60.379	60.376	18
19	59.424	59.414	59.412	19
20	58.458	58.449	58.447	20
21	57.492	57.483	57.481	21
22	56.524	56.516	56.514	22
23	55.556	55.548	55.546	23
24	54.587	54.580	54.578	24
25	53.618	53.611	53.609	25
26	52.648	52.641	52.639	26
27	51.677	51.671	51.669	27
28	50.706	50.700	50.699	28
29	49.735	49.729	49.728	29
30	48.764	48.758	48.757	30
31	47.792	47.787	47.785	31
32	46.821	46.816	46.814	32
33	45.850	45.845	45.843	33
34	44.879	44.874	44.872	34
35	43.909	43.904	43.902	35
36	42.939	42.934	42.932	36
37	41.970	41.965	41.963	37
38	41.003	40.997	40.995	38
39	40.036	40.031	40.029	39
40	39.071	39.066	39.064	40
41	38.108	38.102	38.100	41
42	37.148	37.141	37.139	42
43	36.189	36.182	36.180	43
44	35.234	35.226	35.224	44
45	34.282	34.273	34.271	45
46	33.333	33.323	33.321	46
47	32.388	32.377	32.375	47
48	31.448	31.436	31.433	48
49	30.513	30.499	30.497	49
50	29.583	29.567	29.565	50
51	28.660	28.642	28.639	51
52	27.742	27.722	27.720	52
53	26.833	26.810	26.808	53
54	25.931	25.905	25.903	54
55	25.037	25.009	25.006	55
56	24.153	24.122	24.119	56
57	23.279	23.244	23.240	57
58	22.415	22.376	22.373	58
59	21.563	21.520	21.516	59
60	20.724	20.676	20.670	60
61	19.897	19.844	19.837	61
62	19.084	19.026	19.018	62
63	18.286	18.222	18.212	63
64	17.503	17.433	17.421	64

AM92

x	q_x	$q_{x-1}+1$	e_x	x
65	16.736	16.660	16.645	65
66	15.987	15.903	15.886	66
67	15.255	15.164	15.143	67
68	14.541	14.443	14.418	68
69	13.847	13.740	13.711	69
70	13.172	13.057	13.023	70
71	12.517	12.394	12.354	71
72	11.883	11.751	11.704	72
73	11.270	11.129	11.075	73
74	10.679	10.529	10.467	74
75	10.110	9.950	9.879	75
76	9.562	9.393	9.313	76
77	9.037	8.859	8.768	77
78	8.534	8.346	8.244	78
79	8.053	7.856	7.742	79
80	7.594	7.388	7.261	80
81	7.157	6.942	6.802	81
82	6.741	6.518	6.364	82
83	6.347	6.116	5.947	83
84	5.974	5.734	5.550	84
85	5.620	5.374	5.174	85
86	5.287	5.034	4.817	86
87	4.972	4.713	4.480	87
88	4.676	4.412	4.161	88
89	4.397	4.129	3.861	89
90	4.136	3.864	3.578	90
91		3.616	3.312	91
92			3.063	92
93			2.829	93
94			2.610	94
95			2.405	95
96			2.214	96
97			2.035	97
98			1.869	98
99			1.715	99
100				100
101			1.571	101
102			1.437	102
103			1.314	103
104			1.199	104
105			1.093	105
106			0.994	106
107			0.904	107
108			0.820	108
109			0.743	109
110			0.672	110
111			0.606	111
112			0.546	112
113			0.491	113
114			0.440	114
115			0.394	115
116			0.352	116
117			0.313	117
118			0.277	118
119			0.240	119
120			0.183	120
121			0.000	121

4%

AM92

x	$\ddot{a}_{[x]}$	$A_{[x]}$	${}^2A_{[x]}$	\ddot{a}_x	A_x	2A_x	x
17	23.372	0.101 08	0.016 96	23.367	0.101 27	0.017 16	17
18	23.280	0.104 60	0.017 78	23.276	0.104 78	0.017 97	18
19	23.185	0.108 27	0.018 67	23.180	0.108 44	0.018 85	19
20	23.086	0.112 10	0.019 64	23.081	0.112 26	0.019 82	20
21	22.982	0.116 08	0.020 70	22.978	0.116 24	0.020 86	21
22	22.874	0.120 23	0.021 84	22.870	0.120 38	0.022 00	22
23	22.762	0.124 55	0.023 08	22.758	0.124 69	0.023 24	23
24	22.645	0.129 05	0.024 43	22.641	0.129 19	0.024 58	24
25	22.523	0.133 73	0.025 89	22.520	0.133 86	0.026 03	25
26	22.396	0.138 60	0.027 47	22.393	0.138 73	0.027 61	26
27	22.265	0.143 67	0.029 17	22.261	0.143 79	0.029 31	27
28	22.128	0.148 94	0.031 02	22.124	0.148 94	0.031 15	28
29	21.985	0.154 42	0.033 01	21.982	0.154 54	0.033 14	29
30	21.837	0.160 11	0.035 15	21.834	0.160 23	0.035 28	30
31	21.683	0.166 03	0.037 47	21.680	0.166 15	0.037 59	31
32	21.523	0.172 18	0.039 96	21.520	0.172 30	0.040 08	32
33	21.357	0.178 57	0.042 64	21.354	0.178 68	0.042 76	33
34	21.185	0.185 20	0.045 52	21.182	0.185 31	0.045 65	34
35	21.006	0.192 07	0.048 61	21.003	0.192 19	0.048 74	35
36	20.821	0.199 21	0.051 93	20.818	0.199 33	0.052 07	36
37	20.638	0.206 60	0.055 49	20.635	0.206 72	0.055 63	37
38	20.459	0.214 26	0.059 30	20.456	0.214 39	0.059 45	38
39	20.223	0.222 20	0.063 38	20.219	0.222 34	0.063 54	39
40	20.009	0.230 41	0.067 75	20.005	0.230 56	0.067 92	40
41	19.788	0.238 91	0.072 41	19.784	0.239 07	0.072 59	41
42	19.560	0.247 70	0.077 38	19.555	0.247 87	0.077 58	42
43	19.324	0.256 78	0.082 67	19.319	0.256 96	0.082 89	43
44	19.080	0.266 15	0.088 32	19.075	0.266 36	0.088 56	44
45	18.829	0.275 83	0.094 31	18.823	0.276 05	0.094 58	45
46	18.569	0.285 80	0.100 68	18.563	0.286 05	0.100 98	46
47	18.302	0.296 07	0.107 44	18.295	0.296 35	0.107 78	47
48	18.027	0.306 64	0.114 60	18.019	0.306 95	0.114 98	48
49	17.745	0.317 52	0.122 17	17.736	0.317 86	0.122 60	49
50	17.454	0.328 68	0.130 17	17.444	0.329 07	0.130 65	50
51	17.156	0.340 14	0.138 61	17.145	0.340 58	0.139 15	51
52	16.851	0.351 89	0.147 49	16.838	0.352 38	0.148 11	52
53	16.538	0.363 92	0.156 84	16.524	0.364 48	0.157 55	53
54	16.218	0.376 23	0.166 65	16.202	0.376 85	0.167 45	54
55	15.891	0.388 79	0.176 93	15.873	0.389 50	0.177 85	55
56	15.558	0.401 61	0.187 69	15.537	0.402 40	0.188 74	56
57	15.219	0.414 66	0.198 93	15.195	0.415 56	0.200 12	57
58	14.874	0.427 94	0.210 64	14.847	0.428 96	0.212 00	58
59	14.523	0.441 43	0.222 82	14.493	0.442 58	0.224 37	59
60	14.167	0.455 10	0.235 47	14.134	0.456 40	0.237 23	60
61	13.808	0.468 94	0.248 57	13.769	0.470 41	0.250 58	61
62	13.444	0.482 92	0.262 11	13.401	0.484 58	0.264 40	62
63	13.077	0.497 03	0.276 08	13.029	0.498 90	0.278 68	63
64	12.708	0.511 23	0.290 46	12.653	0.513 33	0.293 40	64

note. ${}^2A_{[x]} = A_{[x]}$ at 8.16% and ${}^2A_x = A_x$ at 8.16%.

AM92

x	$\ddot{a}_{[x]}$	$A_{[x]}$	${}^2A_{[x]}$	\ddot{a}_x	A_x	2A_x	x	4%
65	12.337	0.525 50	0.305 22	12.276	0.527 86	0.308 55	65	
66	11.965	0.539 81	0.320 33	11.896	0.542 46	0.324 10	66	
67	11.592	0.554 14	0.335 78	11.515	0.557 10	0.340 03	67	
68	11.221	0.568 44	0.351 51	11.135	0.571 75	0.356 30	68	
69	10.850	0.582 70	0.367 51	10.754	0.586 38	0.372 89	69	
70	10.481	0.596 87	0.383 72	10.375	0.600 97	0.389 75	70	
71	10.116	0.610 93	0.400 12	9.998	0.615 48	0.406 86	71	
72	9.754	0.624 85	0.416 65	9.623	0.629 88	0.424 16	72	
73	9.396	0.638 60	0.433 27	9.252	0.644 14	0.441 62	73	
74	9.044	0.652 14	0.449 93	8.886	0.658 24	0.459 19	74	
75	8.698	0.665 45	0.466 59	8.524	0.672 14	0.476 83	75	
76	8.359	0.678 51	0.483 20	8.169	0.685 81	0.494 48	76	
77	8.027	0.691 27	0.499 71	7.820	0.699 24	0.512 10	77	
78	7.703	0.703 73	0.516 09	7.478	0.712 38	0.529 65	78	
79	7.388	0.715 85	0.532 27	7.144	0.725 23	0.547 07	79	
80	7.082	0.727 62	0.548 22	6.818	0.737 75	0.564 32	80	
81	6.785	0.739 03	0.563 90	6.502	0.749 93	0.581 36	81	
82	6.499	0.750 05	0.579 27	6.194	0.761 75	0.598 14	82	
83	6.222	0.760 68	0.594 30	5.897	0.773 19	0.614 61	83	
84	5.957	0.770 90	0.608 95	5.610	0.784 25	0.630 75	84	
85	5.701	0.780 72	0.623 20	5.333	0.794 90	0.646 52	85	
86	5.457	0.790 12	0.637 01	5.066	0.805 14	0.661 88	86	
87	5.223	0.799 11	0.650 38	4.811	0.814 98	0.676 80	87	
88	5.000	0.807 69	0.663 29	4.566	0.824 39	0.691 27	88	
89	4.788	0.815 85	0.675 73	4.332	0.833 38	0.705 25	89	
90	4.586	0.823 62	0.687 68	4.109	0.841 96	0.718 74	90	
91				3.897	0.850 12	0.731 72	91	
92				3.695	0.857 87	0.744 17	92	
93				3.504	0.865 22	0.756 09	93	
94				3.323	0.872 18	0.767 48	94	
95				3.153	0.878 75	0.778 34	95	
96				2.992	0.884 94	0.788 67	96	
97				2.840	0.890 77	0.798 47	97	
98				2.698	0.896 25	0.807 76	98	
99				2.564	0.901 39	0.816 54	99	
100				2.439	0.906 21	0.824 83	100	
101				2.321	0.910 71	0.832 63	101	
102				2.212	0.914 92	0.839 97	102	
103				2.110	0.918 85	0.846 86	103	
104				2.015	0.922 51	0.853 31	104	
105				1.926	0.925 91	0.859 34	105	
106				1.844	0.929 07	0.864 98	106	
107				1.768	0.932 01	0.870 23	107	
108				1.697	0.934 72	0.875 12	108	
109				1.632	0.937 24	0.879 66	109	
110				1.571	0.939 56	0.883 87	110	
111				1.516	0.941 70	0.887 77	111	
112				1.464	0.943 67	0.891 37	112	
113				1.417	0.945 49	0.894 69	113	
114				1.374	0.947 15	0.897 75	114	
115				1.334	0.948 68	0.900 56	115	
116				1.298	0.950 08	0.903 15	116	
117				1.264	0.951 39	0.905 57	117	
118				1.229	0.952 73	0.908 04	118	
119				1.176	0.954 78	0.911 81	119	
120				1.000	0.961 54	0.924 56	120	

Note. ${}^2A_{[x]} = A_{[x]}$ at 8.16% and ${}^2A_x = A_x$ at 8.16%.

AM92

%	x	(Iä) _[x]	(IA) _[x]	(Iä) _x	(IA) _x	x
	17	467.226	5.401 64	467.124	5.400 71	17
	18	461.881	5.515 65	461.784	5.514 73	18
	19	456.412	5.630 60	456.320	5.629 69	19
	20	450.817	5.746 37	450.729	5.745 47	20
	21	445.097	5.862 84	445.013	5.861 95	21
	22	439.249	5.979 86	439.170	5.978 99	22
	23	433.275	6.097 30	433.200	6.096 44	23
	24	427.174	6.215 01	427.102	6.214 15	24
	25	420.947	6.332 80	420.878	6.331 95	25
	26	414.593	6.450 51	414.528	6.449 67	26
	27	408.114	6.567 94	408.051	6.567 10	27
	28	401.510	6.684 88	401.450	6.684 05	28
	29	394.783	6.801 12	394.726	6.800 29	29
	30	387.935	6.916 44	387.878	6.915 59	30
	31	380.966	7.030 57	380.911	7.029 72	31
	32	373.879	7.143 28	373.825	7.142 42	32
	33	366.676	7.254 28	366.623	7.253 40	33
	34	359.361	7.363 31	359.308	7.362 39	34
	35	351.937	7.470 05	351.883	7.469 09	35
	36	344.407	7.574 21	344.353	7.573 20	36
	37	336.776	7.675 46	336.720	7.674 38	37
	38	329.048	7.773 46	329.991	7.772 31	38
	39	321.228	7.867 88	321.169	7.866 63	39
	40	313.323	7.958 35	313.260	7.956 99	40
	41	305.337	8.044 52	305.271	8.043 03	41
	42	297.278	8.126 02	297.207	8.124 35	42
	43	289.153	8.202 46	289.077	8.200 60	43
	44	280.970	8.273 47	280.888	8.271 37	44
	45	272.737	8.338 65	272.647	8.336 28	45
	46	264.462	8.397 62	264.365	8.394 93	46
	47	256.156	8.450 01	256.049	8.446 95	47
	48	247.828	8.495 42	247.711	8.491 93	48
	49	239.488	8.533 51	239.360	8.529 50	49
	50	231.149	8.563 90	231.007	8.559 29	50
	51	222.820	8.586 24	222.664	8.580 95	51
	52	214.514	8.600 22	214.342	8.594 12	52
	53	206.244	8.605 54	206.053	8.598 51	53
	54	198.022	8.601 90	197.811	8.593 81	54
	55	189.861	8.589 08	189.627	8.579 76	55
	56	181.774	8.566 87	181.516	8.556 11	56
	57	173.775	8.535 08	173.489	8.522 68	57
	58	165.878	8.493 60	165.561	8.479 31	58
	59	158.094	8.442 34	157.744	8.425 88	59
	60	150.440	8.381 28	150.053	8.362 34	60
	61	142.926	8.310 44	142.499	8.288 67	61
	62	135.566	8.229 90	135.096	8.204 91	62
	63	128.373	8.139 81	127.856	8.111 17	63
	64	121.359	8.040 36	120.790	8.007 60	64

AM92

x	(Iä) _[x]	(IA) _[x]	(Iä) _x	(IA) _x	x	4%
65	114.533	7.931 82	113.911	7.894 42	65	
66	107.909	7.814 53	107.228	7.771 92	66	
67	101.494	7.688 86	100.751	7.640 43	67	
68	95.297	7.555 27	94.489	7.500 35	68	
69	89.327	7.414 26	88.450	7.352 15	69	
70	83.589	7.266 40	82.641	7.196 35	70	
71	78.089	7.112 29	77.067	7.033 51	71	
72	72.832	6.952 57	71.732	6.864 24	72	
73	67.819	6.787 95	66.640	6.689 22	73	
74	63.053	6.619 14	61.793	6.509 13	74	
75	58.534	6.446 87	57.192	6.324 70	75	
76	54.260	6.271 92	52.836	6.136 69	76	
77	50.230	6.095 04	48.723	5.945 86	77	
78	46.440	5.916 97	44.851	5.752 98	78	
79	42.885	5.738 48	41.215	5.558 83	79	
80	39.559	5.560 29	37.811	5.364 17	80	
81	36.457	5.383 08	34.633	5.169 76	81	
82	33.570	5.207 53	31.673	4.976 31	82	
83	30.890	5.034 26	28.924	4.784 53	83	
84	28.410	4.863 82	26.378	4.595 08	84	
85	26.118	4.696 75	24.025	4.408 56	85	
86	24.007	4.533 50	21.858	4.225 55	86	
87	22.065	4.374 48	19.866	4.046 57	87	
88	20.283	4.220 03	18.039	3.872 08	88	
89	18.651	4.070 43	16.368	3.702 50	89	
90	17.159	3.925 89	14.843	3.538 17	90	
91			13.453	3.379 39	91	
92			12.191	3.226 40	92	
93			11.045	3.079 39	93	
94			10.007	2.938 48	94	
95			9.070	2.803 78	95	
96			8.223	2.675 30	96	
97			7.460	2.553 06	97	
98			6.774	2.437 01	98	
99			6.156	2.327 08	99	
100			5.602	2.223 16	100	
101			5.104	2.125 12	101	
102			4.659	2.032 81	102	
103			4.259	1.946 07	103	
104			3.902	1.864 71	104	
105			3.582	1.788 53	105	
106			3.295	1.717 34	106	
107			3.039	1.650 92	107	
108			2.811	1.589 07	108	
109			2.606	1.531 58	109	
110			2.424	1.478 23	110	
111			2.261	1.428 82	111	
112			2.115	1.383 15	112	
113			1.985	1.341 02	113	
114			1.869	1.302 22	114	
115			1.765	1.266 54	115	
116			1.672	1.233 70	116	
117			1.584	1.202 99	117	

AM92

4%	x	$\ddot{a}_{x:\overline{n} }$	$A_{x:\overline{n} }$	n = 60 - x	$\ddot{a}_{x:\overline{n} }$	$A_{x:\overline{n} }$	x
	17	20.941	0.194 59	43	20.936	0.194 75	17
	18	20.750	0.201 90	42	20.746	0.202 06	18
	19	20.552	0.209 53	41	20.548	0.209 68	19
	20	20.346	0.217 46	40	20.342	0.217 60	20
	21	20.131	0.225 72	39	20.128	0.225 86	21
	22	19.908	0.234 32	38	19.904	0.234 45	22
	23	19.675	0.243 27	37	19.672	0.243 40	23
	24	19.433	0.252 59	36	19.430	0.252 71	24
	25	19.181	0.262 28	35	19.178	0.262 40	25
	26	18.918	0.272 37	34	18.916	0.272 48	26
	27	18.645	0.282 87	33	18.643	0.282 97	27
	28	18.361	0.293 79	32	18.359	0.293 89	28
	29	18.066	0.305 15	31	18.064	0.305 25	29
	30	17.759	0.316 97	30	17.756	0.317 06	30
	31	17.439	0.329 26	29	17.437	0.329 35	31
	32	17.107	0.342 04	28	17.105	0.342 12	32
	33	16.762	0.355 33	27	16.759	0.355 41	33
	34	16.402	0.369 14	26	16.400	0.369 23	34
	35	16.029	0.383 50	25	16.027	0.383 59	35
	36	15.641	0.398 43	24	15.639	0.398 52	36
	37	15.237	0.413 95	23	15.235	0.414 03	37
	38	14.818	0.430 07	22	14.816	0.430 16	38
	39	14.383	0.446 82	21	14.380	0.446 92	39
	40	13.930	0.464 23	20	13.927	0.464 33	40
	41	13.460	0.482 31	19	13.457	0.482 42	41
	42	12.971	0.501 10	18	12.969	0.501 21	42
	43	12.464	0.520 61	17	12.461	0.520 73	43
	44	11.937	0.540 88	16	11.934	0.541 00	44
	45	11.390	0.561 93	15	11.386	0.562 06	45
	46	10.821	0.583 80	14	10.818	0.583 93	46
	47	10.231	0.606 51	13	10.227	0.606 65	47
	48	9.617	0.630 10	12	9.613	0.630 25	48
	49	8.980	0.654 61	11	8.976	0.654 77	49
	50	8.318	0.680 07	10	8.314	0.680 24	50
	51	7.630	0.706 54	9	7.625	0.706 72	51
	52	6.914	0.734 06	8	6.910	0.734 24	52
	53	6.170	0.762 68	7	6.166	0.762 86	53
	54	5.396	0.792 46	6	5.391	0.792 64	54
	55	4.590	0.823 48	5	4.585	0.823 65	55
	56	3.749	0.855 80	4	3.745	0.855 95	56
	57	2.873	0.889 52	3	2.870	0.889 63	57
	58	1.957	0.924 73	2	1.955	0.924 79	58
	59	1.000	0.961 54	1	1.000	0.961 54	59

AM92

x	$\ddot{a}_{x:\overline{n} }$	$A_{x:\overline{n} }$	n = 65 - x	$\ddot{a}_{x:\overline{n} }$	$A_{x:\overline{n} }$	x	4%
17	21.723	0.164 48	48	21.719	0.164 66	17	
18	21.565	0.170 58	47	21.561	0.170 74	18	
19	21.400	0.176 93	46	21.396	0.177 09	19	
20	21.228	0.183 54	45	21.224	0.183 69	20	
21	21.049	0.190 42	44	21.045	0.190 57	21	
22	20.863	0.197 59	43	20.859	0.197 73	22	
23	20.669	0.205 05	42	20.665	0.205 18	23	
24	20.467	0.212 81	41	20.464	0.212 94	24	
25	20.257	0.220 90	40	20.254	0.221 02	25	
26	20.038	0.229 31	39	20.035	0.229 42	26	
27	19.811	0.238 05	38	19.808	0.238 17	27	
28	19.574	0.247 16	37	19.571	0.247 26	28	
29	19.328	0.256 62	36	19.325	0.256 73	29	
30	19.072	0.266 47	35	19.069	0.266 57	30	
31	18.806	0.276 71	34	18.803	0.276 81	31	
32	18.529	0.287 35	33	18.526	0.287 45	32	
33	18.241	0.298 42	32	18.239	0.298 52	33	
34	17.942	0.309 92	31	17.940	0.310 02	34	
35	17.631	0.321 87	30	17.629	0.321 97	35	
36	17.308	0.334 29	29	17.306	0.334 39	36	
37	16.973	0.347 19	28	16.970	0.347 29	37	
38	16.625	0.360 59	27	16.622	0.360 70	38	
39	16.263	0.374 51	26	16.260	0.374 62	39	
40	15.887	0.388 96	25	15.884	0.389 07	40	
41	15.497	0.403 95	24	15.494	0.404 07	41	
42	15.092	0.419 52	23	15.089	0.419 65	42	
43	14.672	0.435 67	22	14.669	0.435 81	43	
44	14.237	0.452 43	21	14.233	0.452 58	44	
45	13.785	0.469 82	20	13.780	0.469 98	45	
46	13.316	0.487 86	19	13.311	0.488 03	46	
47	12.829	0.506 56	18	12.824	0.506 75	47	
48	12.325	0.525 96	17	12.320	0.526 17	48	
49	11.802	0.546 08	16	11.796	0.546 30	49	
50	11.259	0.566 95	15	11.253	0.567 19	50	
51	10.697	0.588 58	14	10.690	0.588 84	51	
52	10.113	0.611 02	13	10.106	0.611 30	52	
53	9.508	0.634 30	12	9.500	0.634 60	53	
54	8.880	0.658 46	11	8.872	0.658 78	54	
55	8.228	0.683 54	10	8.219	0.683 88	55	
56	7.551	0.709 58	9	7.542	0.709 93	56	
57	6.847	0.736 64	8	6.838	0.737 01	57	
58	6.115	0.764 79	7	6.106	0.765 16	58	
59	5.353	0.794 10	6	5.344	0.794 46	59	
60	4.559	0.824 65	5	4.550	0.824 99	60	
61	3.730	0.856 54	4	3.722	0.856 85	61	
62	2.863	0.889 90	3	2.857	0.890 13	62	
63	1.954	0.924 85	2	1.951	0.924 98	63	
64	1.000	0.961 54	1	1.000	0.961 54	64	

AM92

6%

x	$\ddot{a}_{\overline{x} }$	$A_{\overline{x} }$	$^2A_{\overline{x} }$	\ddot{a}_x	A_x	2A_x	x
17	16.977	0.039 02	0.006 11	16.974	0.039 21	0.006 30	17
18	16.946	0.040 80	0.006 30	16.943	0.040 99	0.006 48	18
19	16.912	0.042 70	0.006 52	16.909	0.042 88	0.006 69	19
20	16.877	0.044 72	0.006 77	16.874	0.044 89	0.006 93	20
21	16.839	0.046 86	0.007 05	16.836	0.047 03	0.007 21	21
22	16.798	0.049 14	0.007 38	16.796	0.049 30	0.007 53	22
23	16.756	0.051 57	0.007 75	16.753	0.051 72	0.007 90	23
24	16.710	0.054 14	0.008 16	16.708	0.054 28	0.008 31	24
25	16.662	0.056 86	0.008 63	16.660	0.057 01	0.008 77	25
26	16.611	0.059 76	0.009 16	16.609	0.059 90	0.009 30	26
27	16.557	0.062 82	0.009 75	16.554	0.062 96	0.009 88	27
28	16.499	0.066 07	0.010 41	16.497	0.066 20	0.010 54	28
29	16.439	0.069 51	0.011 15	16.436	0.069 64	0.011 28	29
30	16.374	0.073 16	0.011 97	16.372	0.073 28	0.012 10	30
31	16.306	0.077 01	0.012 89	16.304	0.077 14	0.013 01	31
32	16.234	0.081 09	0.013 90	16.232	0.081 21	0.014 03	32
33	16.158	0.085 40	0.015 03	16.156	0.085 52	0.015 15	33
34	16.078	0.089 95	0.016 27	16.075	0.090 07	0.016 40	34
35	15.993	0.094 75	0.017 65	15.990	0.094 88	0.017 78	35
36	15.903	0.099 82	0.019 16	15.901	0.099 95	0.019 30	36
37	15.809	0.105 16	0.020 84	15.806	0.105 30	0.020 98	37
38	15.709	0.110 79	0.022 67	15.707	0.110 94	0.022 82	38
39	15.605	0.116 72	0.024 69	15.602	0.116 88	0.024 85	39
40	15.494	0.122 96	0.026 90	15.491	0.123 13	0.027 07	40
41	15.378	0.129 52	0.029 33	15.375	0.129 70	0.029 51	41
42	15.257	0.136 41	0.031 98	15.253	0.136 60	0.032 18	42
43	15.129	0.143 65	0.034 87	15.125	0.143 85	0.035 09	43
44	14.995	0.151 23	0.038 02	14.991	0.151 46	0.038 26	44
45	14.855	0.159 18	0.041 45	14.850	0.159 43	0.041 72	45
46	14.708	0.167 50	0.045 17	14.703	0.167 78	0.045 48	46
47	14.554	0.176 19	0.049 21	14.548	0.176 51	0.049 56	47
48	14.393	0.185 28	0.053 59	14.387	0.185 63	0.053 98	48
49	14.226	0.194 76	0.058 32	14.219	0.195 16	0.058 76	49
50	14.051	0.204 63	0.063 42	14.044	0.205 08	0.063 92	50
51	13.870	0.214 91	0.068 92	13.861	0.215 42	0.069 49	51
52	13.681	0.225 60	0.074 83	13.671	0.226 17	0.075 48	52
53	13.485	0.236 69	0.081 18	13.474	0.237 34	0.081 92	53
54	13.282	0.248 18	0.087 97	13.269	0.248 92	0.088 82	54
55	13.072	0.260 08	0.095 24	13.057	0.260 92	0.096 21	55
56	12.855	0.272 37	0.102 98	12.838	0.273 33	0.104 09	56
57	12.631	0.285 06	0.111 23	12.612	0.286 14	0.112 50	57
58	12.400	0.298 12	0.119 98	12.378	0.299 35	0.121 44	58
59	12.163	0.311 55	0.129 26	12.138	0.312 94	0.130 93	59
60	11.919	0.325 33	0.139 07	11.891	0.326 92	0.140 98	60
61	11.670	0.339 45	0.149 41	11.638	0.341 25	0.151 60	61
62	11.415	0.353 88	0.160 29	11.379	0.355 92	0.162 80	62
63	11.155	0.368 61	0.171 71	11.114	0.370 91	0.174 57	63
64	10.890	0.383 60	0.183 66	10.844	0.386 20	0.186 92	64

Note: $^2A_{\overline{x}|} = A_{\overline{x}|}$ at 12.36% and $^2A_x = A_x$ at 12.36%.

AM92

6%

x	$\ddot{a}_{\overline{x} }$	$A_{\overline{x} }$	$^2A_{\overline{x} }$	\ddot{a}_x	A_x	2A_x	x
65	10.621	0.398 83	0.196 14	10.569	0.401 77	0.199 85	65
66	10.348	0.414 27	0.209 13	10.289	0.417 58	0.213 35	66
67	10.072	0.429 88	0.222 62	10.006	0.433 61	0.227 40	67
68	9.794	0.445 64	0.236 58	9.720	0.449 82	0.242 00	68
69	9.513	0.461 50	0.251 00	9.431	0.466 17	0.257 12	69
70	9.232	0.477 43	0.265 83	9.140	0.482 65	0.272 74	70
71	8.950	0.493 38	0.281 06	8.848	0.499 19	0.288 82	71
72	8.669	0.509 33	0.296 64	8.555	0.515 78	0.305 34	72
73	8.388	0.525 21	0.312 54	8.262	0.532 36	0.322 26	73
74	8.109	0.541 01	0.328 70	7.969	0.548 90	0.339 55	74
75	7.832	0.556 67	0.345 09	7.679	0.565 35	0.357 14	75
76	7.559	0.572 15	0.361 64	7.390	0.581 69	0.375 01	76
77	7.289	0.587 42	0.378 33	7.105	0.597 86	0.393 09	77
78	7.024	0.602 44	0.395 08	6.822	0.613 83	0.411 33	78
79	6.763	0.617 17	0.411 86	6.544	0.629 56	0.429 69	79
80	6.509	0.631 59	0.428 60	6.271	0.645 01	0.448 11	80
81	6.260	0.645 66	0.445 25	6.004	0.660 16	0.466 52	81
82	6.018	0.659 35	0.461 77	5.742	0.674 97	0.484 88	82
83	5.783	0.672 63	0.478 11	5.487	0.689 42	0.503 13	83
84	5.556	0.685 53	0.494 22	5.239	0.703 46	0.521 21	84
85	5.336	0.697 97	0.510 05	4.998	0.717 10	0.539 07	85
86	5.124	0.709 97	0.525 57	4.765	0.730 29	0.556 67	86
87	4.920	0.721 50	0.540 75	4.540	0.743 04	0.573 96	87
88	4.724	0.732 58	0.555 55	4.323	0.755 31	0.590 88	88
89	4.537	0.743 18	0.569 94	4.114	0.767 11	0.607 41	89
90	4.358	0.753 32	0.583 90	3.914	0.778 43	0.623 50	90
91				3.723	0.789 25	0.639 13	91
92				3.541	0.799 59	0.654 26	92
93				3.367	0.809 44	0.668 88	93
94				3.201	0.818 80	0.682 96	94
95				3.044	0.827 69	0.696 49	95
96				2.896	0.836 10	0.709 46	96
97				2.755	0.844 06	0.721 87	97
98				2.622	0.851 56	0.733 70	98
99				2.498	0.858 63	0.744 96	99
100				2.380	0.865 27	0.755 65	100
101				2.270	0.871 51	0.765 79	101
102				2.167	0.877 36	0.775 37	102
103				2.070	0.882 83	0.784 42	103
104				1.980	0.887 94	0.792 93	104
105				1.895	0.892 71	0.800 94	105
106				1.817	0.897 15	0.808 45	106
107				1.744	0.901 28	0.815 48	107
108				1.676	0.905 11	0.822 05	108
109				1.614	0.908 66	0.828 17	109
110				1.556	0.911 95	0.833 87	110
111				1.502	0.914 99	0.839 17	111
112				1.452	0.917 79	0.844 08	112
113				1.407	0.920 37	0.848 61	113
114				1.365	0.922 75	0.852 80	114
115				1.326	0.924 92	0.856 66	115
116				1.291	0.926 93	0.860 22	116
117				1.258	0.928 80	0.863 55	117
118				1.224	0.930 72	0.866 94	118
119				1.172	0.933 64	0.872 10	119
120				1.000	0.943 40	0.890 00	120

Note: $^2A_{\overline{x}|} = A_{\overline{x}|}$ at 12.36% and $^2A_x = A_x$ at 12.36%.

AM92

6%

x	$(\ddot{a})_{x }$	$(IA)_{x }$	$(\ddot{a})_x$	$(IA)_x$	x
17	268.142	1.799 55	268.083	1.799 40	17
18	266.392	1.867 08	266.336	1.866 92	18
19	264.567	1.936 81	264.514	1.936 64	19
20	262.666	2.008 74	262.615	2.008 56	20
21	260.687	2.082 89	260.638	2.082 70	21
22	258.626	2.159 25	258.579	2.159 06	22
23	256.482	2.237 82	256.437	2.237 62	23
24	254.253	2.318 58	254.210	2.318 37	24
25	251.936	2.401 51	251.896	2.401 29	25
26	249.531	2.486 57	249.491	2.486 35	26
27	247.034	2.573 73	246.996	2.573 50	27
28	244.444	2.662 93	244.407	2.662 70	28
29	241.759	2.754 10	241.724	2.753 86	29
30	238.978	2.847 18	238.943	2.846 92	30
31	236.099	2.942 06	236.065	2.941 80	31
32	233.120	3.038 64	233.087	3.038 37	32
33	230.041	3.136 81	230.008	3.136 53	33
34	226.861	3.236 43	226.827	3.236 13	34
35	223.579	3.337 35	223.545	3.337 02	35
36	220.194	3.439 40	220.159	3.439 04	36
37	216.706	3.542 39	216.671	3.542 00	37
38	213.116	3.646 13	213.079	3.645 69	38
39	209.424	3.750 37	209.385	3.749 89	39
40	205.630	3.854 89	205.589	3.854 35	40
41	201.736	3.959 42	201.692	3.958 80	41
42	197.744	4.063 68	197.696	4.062 97	42
43	193.654	4.167 36	193.603	4.166 55	43
44	189.471	4.270 14	189.416	4.269 22	44
45	185.197	4.371 70	185.136	4.370 62	45
46	180.834	4.471 66	180.768	4.470 41	46
47	176.388	4.569 65	176.315	4.568 20	47
48	171.863	4.665 29	171.783	4.663 59	48
49	167.264	4.758 18	167.175	4.756 18	49
50	162.597	4.847 89	162.497	4.845 55	50
51	157.867	4.934 00	157.757	4.931 26	51
52	153.082	5.016 09	152.959	5.012 87	52
53	148.249	5.093 72	148.113	5.089 94	53
54	143.376	5.166 47	143.224	5.162 03	54
55	138.472	5.233 89	138.302	5.228 68	55
56	133.545	5.295 58	133.356	5.289 47	56
57	128.605	5.351 13	128.394	5.343 97	57
58	123.662	5.400 16	123.427	5.391 76	58
59	118.726	5.442 29	118.464	5.432 47	59
60	113.808	5.477 20	113.516	5.465 72	60
61	108.918	5.504 57	108.594	5.491 18	61
62	104.067	5.524 16	103.707	5.508 56	62
63	99.267	5.535 74	98.868	5.517 59	63
64	94.528	5.539 13	94.087	5.518 08	64

AM92

6%

x	$(\ddot{a})_{x }$	$(IA)_{x }$	$(\ddot{a})_x$	$(IA)_x$	x
65	89.861	5.534 21	89.374	5.509 85	65
66	85.277	5.520 93	84.740	5.492 80	66
67	80.785	5.499 28	80.196	5.466 88	67
68	76.397	5.469 31	75.752	5.432 09	68
69	72.121	5.431 14	71.416	5.388 51	69
70	67.965	5.384 97	67.198	5.336 28	70
71	63.939	5.331 01	63.105	5.275 60	71
72	60.048	5.269 59	59.146	5.206 73	72
73	56.300	5.201 07	55.326	5.129 99	73
74	52.700	5.125 86	51.652	5.045 77	74
75	49.251	5.044 44	48.128	4.954 52	75
76	45.958	4.957 31	44.758	4.856 72	76
77	42.822	4.865 04	41.545	4.752 91	77
78	39.846	4.768 19	38.491	4.643 69	78
79	37.028	4.667 37	35.596	4.529 64	79
80	34.369	4.563 20	32.860	4.411 42	80
81	31.866	4.456 30	30.283	4.289 68	81
82	29.517	4.347 29	27.861	4.165 09	82
83	27.320	4.236 78	25.594	4.038 31	83
84	25.268	4.125 36	23.475	3.910 00	84
85	23.359	4.013 61	21.503	3.780 82	85
86	21.586	3.902 05	19.671	3.651 39	86
87	19.944	3.791 19	17.974	3.522 31	87
88	18.426	3.681 49	16.406	3.394 16	88
89	17.026	3.573 36	14.962	3.267 46	89
90	15.738	3.467 16	13.634	3.142 70	90
91			12.417	3.020 33	91
92			11.303	2.900 75	92
93			10.287	2.784 31	93
94			9.361	2.671 32	94
95			8.518	2.562 02	95
96			7.754	2.456 63	96
97			7.061	2.355 32	97
98			6.435	2.258 21	98
99			5.869	2.165 37	99
100			5.358	2.076 86	100
101			4.898	1.992 70	101
102			4.483	1.912 86	102
103			4.111	1.837 31	103
104			3.776	1.765 98	104
105			3.475	1.698 78	105
106			3.205	1.635 63	106
107			2.963	1.576 39	107
108			2.746	1.520 96	108
109			2.551	1.469 20	109
110			2.377	1.420 96	110
111			2.221	1.376 11	111
112			2.081	1.334 50	112
113			1.956	1.295 98	113
114			1.845	1.260 40	114
115			1.744	1.227 60	115
116			1.654	1.197 34	116
117			1.570	1.169 04	117
118			1.481	1.140 18	118
119			1.395	1.096 31	119

AM92

6%

x	$\ddot{a}_{x:\overline{n} }$	$A_{x:\overline{n} }$	$n = 60 - x$	$\ddot{a}_{x:\overline{n} }$	$A_{x:\overline{n} }$	x
17	16.076	0.090 05	43	16.072	0.090 24	17
18	15.990	0.094 93	42	15.986	0.095 11	18
19	15.898	0.100 11	41	15.895	0.100 28	19
20	15.801	0.105 61	40	15.798	0.105 77	20
21	15.698	0.111 45	39	15.695	0.111 60	21
22	15.588	0.117 64	38	15.586	0.117 79	22
23	15.472	0.124 22	37	15.470	0.124 36	23
24	15.349	0.131 19	36	15.347	0.131 33	24
25	15.218	0.138 59	35	15.216	0.138 72	25
26	15.080	0.146 43	34	15.078	0.146 56	26
27	14.933	0.154 75	33	14.931	0.154 87	27
28	14.777	0.163 57	32	14.775	0.163 69	28
29	14.612	0.172 92	31	14.610	0.173 03	29
30	14.437	0.182 83	30	14.435	0.182 94	30
31	14.251	0.193 33	29	14.249	0.193 44	31
32	14.054	0.204 46	28	14.053	0.204 57	32
33	13.846	0.216 26	27	13.844	0.216 36	33
34	13.625	0.228 75	26	13.624	0.228 85	34
35	13.392	0.241 98	25	13.390	0.242 08	35
36	13.144	0.255 99	24	13.142	0.256 09	36
37	12.882	0.270 82	23	12.880	0.270 93	37
38	12.605	0.286 53	22	12.603	0.286 64	38
39	12.311	0.303 16	21	12.309	0.303 27	39
40	12.000	0.320 76	20	11.998	0.320 88	40
41	11.671	0.339 38	19	11.669	0.339 51	41
42	11.323	0.359 10	18	11.320	0.359 23	42
43	10.954	0.379 96	17	10.952	0.380 10	43
44	10.564	0.402 03	16	10.561	0.402 19	44
45	10.151	0.425 39	15	10.149	0.425 56	45
46	9.715	0.450 11	14	9.712	0.450 28	46
47	9.253	0.476 26	13	9.249	0.476 45	47
48	8.764	0.503 94	12	8.760	0.504 15	48
49	8.246	0.533 24	11	8.242	0.533 46	49
50	7.698	0.564 26	10	7.694	0.564 49	50
51	7.118	0.597 11	9	7.114	0.597 35	51
52	6.503	0.631 91	8	6.499	0.632 16	52
53	5.851	0.668 79	7	5.847	0.669 04	53
54	5.160	0.707 91	6	5.156	0.708 15	54
55	4.427	0.749 41	5	4.423	0.749 65	55
56	3.648	0.793 50	4	3.645	0.793 70	56
57	2.820	0.840 36	3	2.817	0.840 52	57
58	1.939	0.890 24	2	1.937	0.890 34	58
59	1.000	0.943 40	1	1.000	0.943 40	59

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6%

x	$\ddot{a}_{x:\overline{n} }$	$A_{x:\overline{n} }$	$n = 65 - x$	$\ddot{a}_{x:\overline{n} }$	$A_{x:\overline{n} }$	x
17	16.409	0.071 21	48	16.405	0.071 40	17
18	16.343	0.074 95	47	16.339	0.075 13	18
19	16.272	0.078 92	46	16.269	0.079 09	19
20	16.198	0.083 13	45	16.195	0.083 30	20
21	16.119	0.087 61	44	16.116	0.087 77	21
22	16.035	0.092 36	43	16.032	0.092 51	22
23	15.946	0.097 40	42	15.943	0.097 54	23
24	15.852	0.102 74	41	15.849	0.102 88	24
25	15.751	0.108 42	40	15.749	0.108 55	25
26	15.645	0.114 43	39	15.643	0.114 56	26
27	15.532	0.120 81	38	15.530	0.120 94	27
28	15.413	0.127 58	37	15.411	0.127 70	28
29	15.286	0.134 75	36	15.284	0.134 86	29
30	15.152	0.142 34	35	15.150	0.142 46	30
31	15.010	0.150 39	34	15.008	0.150 50	31
32	14.859	0.158 92	33	14.857	0.159 03	32
33	14.700	0.167 95	32	14.698	0.168 06	33
34	14.531	0.177 51	31	14.529	0.177 62	34
35	14.352	0.187 63	30	14.350	0.187 74	35
36	14.163	0.198 33	29	14.161	0.198 45	36
37	13.963	0.209 67	28	13.960	0.209 79	37
38	13.751	0.221 65	27	13.749	0.221 78	38
39	13.527	0.234 33	26	13.525	0.234 46	39
40	13.290	0.247 74	25	13.288	0.247 87	40
41	13.040	0.261 91	24	13.037	0.262 06	41
42	12.775	0.276 89	23	12.772	0.277 05	42
43	12.495	0.292 72	22	12.492	0.292 89	43
44	12.200	0.309 44	21	12.197	0.309 63	44
45	11.888	0.327 11	20	11.884	0.327 31	45
46	11.558	0.345 78	19	11.554	0.345 99	46
47	11.210	0.365 49	18	11.206	0.365 72	47
48	10.842	0.386 30	17	10.837	0.386 56	48
49	10.454	0.408 28	16	10.449	0.408 57	49
50	10.044	0.431 50	15	10.038	0.431 81	50
51	9.610	0.456 02	14	9.604	0.456 35	51
52	9.153	0.481 91	13	9.146	0.482 28	52
53	8.669	0.509 27	12	8.662	0.509 67	53
54	8.159	0.538 19	11	8.151	0.538 62	54
55	7.618	0.568 77	10	7.610	0.569 22	55
56	7.047	0.601 12	9	7.038	0.601 60	56
57	6.442	0.635 36	8	6.433	0.635 86	57
58	5.801	0.671 65	7	5.792	0.672 16	58
59	5.121	0.710 15	6	5.112	0.710 66	59
60	4.398	0.751 04	5	4.390	0.751 52	60
61	3.630	0.794 54	4	3.622	0.794 97	61
62	2.811	0.840 90	3	2.805	0.841 23	62
63	1.936	0.890 42	2	1.933	0.890 60	63
64	1.000	0.943 40	1	1.000	0.943 40	64